Level 2 Requirements - SYM_DistributeStateData

The SYM_DistributeStateData function shall maintain a local repository of state data and provide state data to other SYM functions and CCS subsystems. The SYM_Dsd function shall provide the capability to subscribe/unsubscribe to a continuous state data feed. The SYM_Dsd function shall provide the capability for a one-time request of current state information about one or more mnemonics. The SYM_Dsd function has two major subfunctions: Input State Data (ISD), Manage State Data Requests (MSDR)

2.1 The Input State Data function shall accept processed telemetry from the FEP subsystem. ISD shall accept state change information from the CMD subsystem. ISD shall accept state data updates from the SYM_Dtf function. In historical replay mode, ISD shall accept processed telemetry and state change information from the SYM_Cnt function.

2.2 The Manage State Data Requests function shall accept and process requests (from other SYM functions and CCS subsystems) for state data. The MSDR function shall support both one-time and continuous feed requests.

Detail Level Requirements - SYM_DistributeStateData

Input State Data

The following section of the document presents the functional and detail level requirements for the *SYM_DistributeStateData , Input State Data (ISD)* function.

(EXT)
2.1.1 The ISD shall receive HST telemetry, from the Front-End Processor (FEP) subsystem, in standard FEP format. This shall be changes only data.

(Source: DLPs 4.02.01.03.01, 4.02.02.02.01, 4.03.01.03.01, 4.03.02.02.01 Legacy Req'ts, TALOS 6.1a)

2.1.1.1 The telemetry shall consist of packets containing the following:

- Data Source
- Telemetry Format
- Spacecraft Time
- UTC Time
- GRT Time
- Number of Elements
- Element Array containing:
  - Mnemonic ID
  - Flags
  - Raw Value
  - EU Value

(EXT)
2.1.2 The ISD shall receive SMS telemetry, from the Front-End Processor (FEP), in standard FEP format. This shall be changes only data.

(Source: DLPs 4.02.01.03.04, 4.03.01.03.04, 4.03.02.02.01, Legacy Req'ts TALOS 6.1a)

(RPL)
2.1.3 The ISD shall receive merged telemetry data from SYM_Cnt.

(Source: Top-Down Architecture)

(EXT)
2.1.4 The ISD shall receive, from the Command Subsystem, notification of commands sent to the HST.

(Source: DLPs 3.01.02.02.01, 3.01.02.06.08, 4.02.02.01.01 - .02
4.02.02.01.05,4.03.02.01.01 - 02, 4.03.02.01.06)

2.1.4.1 The ISD shall receive notification from the Command Subsystem when the next scheduled command is ready to be sent. Required parameters may be included in this notification.

2.1.4.2 The ISD shall receive, from the Command Subsystem via filtered events, notification that a command has been sent to the HST.

(RPL)
2.1.5 The ISD shall receive, from the SYM_Cnt, notification of commands sent to the HST.

(Source: Top-Down Architecture)

2.1.5.1 The ISD shall receive notification from the SYM_Cnt when the next scheduled command was to be sent.

2.1.5.3 The ISD shall receive, from the SYM_Cnt, via filtered events, notification that a command was sent to the HST.

2.1.5 The ISD shall receive state data from the SYM_Dtf function. State data shall include the following:

- Expected State Data
  - Expected State
  - ES Format (EU/Raw)
  - Tolerance
  - Time Stamp
  - Compare/Don't Compare Status
- Compare Status
- Derived Parameter True States
- Compare Process Active Status
- Orbital Events

(Source: Top-Down Architecture)

2.1.6 The ISD shall receive, from the SYM_PerformLegacy function via filtered events, state data information. The following interfaces shall be supported:

- FINATT (Fine Attitude) - difference values (angles or quaternians???)
  Attitude Reference Update (ARU) file - to be kept for a limited time only - as long as it is "useful"
- CRSATT (Course Attitude) - difference values (angles or quaternians???)
- DRB(Gyro Drift Rate Bias) - 3 coefficients

(Source: DLPs 4.01.01.07.01 - 05, 4.01.01.07.12 - 15, 4.01.01.08.12 - 14,

4.02.03.02.01 - 02)

2.1.7 The ISD shall receive, from the SYM_ManageEvents function, filtered events that contain state updates. In particular, The ISD shall receive FEP events pertinent to the actual state of the SN.

(Source: DLPs 4.02.04.03.03 - 06, 4.02.04.02.12, 4.03.03.02.03 - 06, 4.03.03.02.12)

2.1.8 The ISD shall generate event messages for all significant failures and status updates.

(Source: Top-Down Architecture)

2.1.8.1 The ISD shall assign all such event messages a criticality.

2.1.8.2 The ISD shall send, to the SYM_ManageEvents function, all such event messages.

Manage State Data Requests

The following section of the document presents the functional and detail level requirements for the *SYM_DistributeStateData , Manage State Data Requests (MSDR)* function.

2.2.1 The MSDR shall process requests for a single snapshot of current state data for one or more mnemonics. All relevant ES, TS and comparison data shall be sent to the requester.

(Source: DLPs 4.02.02.01.07)

2.2.2 The MSDR shall process requests for current true state values. This value shall be supplied to the requester.

(Source: DLPs 3.01.02.03.02, 3.01.02.03.04, 3.01.02.04.05, 3.01.02.06.02
3.01.02.06.07,.01.03.06.01 - 02, 4.02.02.01.07, 4.02.02.04.01,
4.02.04.04.01, 4.02.04.04.03, 4.03.03.04.01, 4.03.03.04.03)

2.2.3 The MSDR shall process requests for comparison results (is TS = ES tolerance?). MSDR shall provide a Yes/No response.

(Source: DLPs 4.02.02.01.07, 4.02.02.04.01, 4.02.04.04.01, 4.02.04.04.04,
4.03.03.04.01, 4.03.03.04.04)

2.2.4 The MSDR shall provide the capability to allow other SYM functions and CCS subsystems to subscribe/unsubscribe to a continuous feed of state data information. In addition, requesters may add mnemonics to, or delete mnemonics from, their subscription list.

(Source: DLPs 4.01.01.02.11, 4.01.01.05.04, 4.01.01.09.05,
4.02.02.05.01 - 02, 4.02.04.05.01 - 02, 4.03.02.01.14,
4.03.02.02.02, 4.03.02.05.01 - 02, 4.03.03.05.01 - 02,
Legacy Reqts, TALOS 6.3.1)

2.2.4.1 The MSDR shall provide the capability to allow other SYM functions and CCS subsystems to select the update rate for their continuous feed as follows:

- Changes only
- Every X seconds
- Every Nth sample
- All points

2.2.5 The MSDR shall generate event messages for all significant failures and status updates.

(Source: Top-Down Architecture)

2.2.5.1 The MSDR shall assign all such event messages a criticality.

2.2.5.2 The MSRD shall send, to the SYM_ManageEvents function, all such event messages.